

CLAIMS

What is claimed is:

1. (Previously Presented) A tube-forming device comprising:
 - a) a work piece holder to receive a tubular work piece;
 - b) a tool insertable into an end of the tubular work piece held by the work piece holder;
 - c) a tool holder to receive the tool and movable in first and second directions;
 - d) a first rotating cam to drive the tool holder in the first direction during a first phase of a tool cycle to engage the tool with a first side of the work piece; and
 - e) a second rotating cam driven synchronously with the first rotating cam to drive the tool holder in a second direction during a second phase of the tool cycle to engage the tool with the second side of the work piece.
2. (Original) The tube-forming device of claim 1 wherein the work piece holder comprises a die block having an opening therein to receive the work piece.
3. (Original) The tube-forming device of claim 2 wherein the work piece holder further comprises an interchangeable die insertable into the opening in the die block.
4. (Original) The tube-forming device of claim 3 wherein the die comprises a sleeve that surrounds the work piece.
5. (Original) The tube-forming device of claim 4 wherein the die further comprises a cutting edge that cooperates with the tool to shear the work piece.
6. (Original) The tube-forming device of claim 1 wherein the tool comprises a shear.

7. (Previously Presented) The tube-forming device of claim 6 wherein the shear is shaped to notch the end of the tubular work piece.

8. (Original) The tube-forming device of claim 1 wherein the tool comprises a piercing tool to form an opening in the work piece.

9. (Original) The tube-forming device of claim 1 further comprising a plurality of interchangeable tools.

10. (Original) The tube-forming device of claim 1 wherein the tool holder comprises a reciprocating carrier block having an opening therein to receive the tool.

11. (Original) The tube-forming device of claim 10 wherein the carrier block has first and second cam openings therein adapted to receive the first and second cams respectively.

12. (Previously Presented) The tube-forming device of claim 11 wherein the first cam opening has a first cam surface engaged by the first cam during the first phase of the tool cycle to move the carrier block in the first direction and wherein the second cam opening has a second cam surface engaged by the second cam during the second phase of the tool cycle to move the carrier block in the second direction.

13. (Previously Presented) The tube-forming device of claim 10 further comprising biasing means to bias the carrier block to a neutral position in which the tool is centered with respect to the work piece.

14. (Original) The tube-forming device of claim 13 wherein the biasing means comprises at least one spring that presses against the carrier block.

15. (Previously Presented) A tube-forming device comprising:

- a) a work piece holder to receive a tubular work piece;
- b) a tool insertable into an end of the tubular work piece held by the work piece holder;
- c) a tool holder to receive the tool and movable in first and second directions; and
- d) a dual action rotating cam assembly to drive the tool holder in a first direction during a first phase of a tool cycle to engage the tool with a first side of the work piece, and to drive the tool holder in a second direction during a second phase of the tool cycle to engage the tool with a second side of the work piece.

16. (Original) The tube-forming device of claim 15 wherein the work piece holder comprises a die block having an opening therein to receive the work piece.

17. (Original) The tube-forming device of claim 16 wherein the work piece holder further comprises an interchangeable die insertable into the opening in the die block.

18. (Original) The tube-forming device of claim 17 wherein the die comprises a sleeve that surrounds the work piece.

19. (Original) The tube-forming device of claim 18 wherein the die further comprises a cutting edge that cooperates with the tool to shear the work piece.

20. (Original) The tube-forming device of claim 15 wherein the tool comprises a shear.

21. (Original) The tube-forming device of claim 20 wherein the shear is shaped to notch the end of the work piece.

22. (Original) The tube-forming device of claim 15 wherein the tool comprises a piercing tool to form an opening in the work piece.

23. (Original) The tube-forming device of claim 15 further comprising a plurality of interchangeable tools.

24. (Original) The tube-forming device of claim 15 wherein the tool holder comprises a reciprocating carrier block having an opening therein to receive the tool.

25. (Previously Presented) The tube-forming device of claim 24 wherein the carrier block has first and second cam openings therein adapted to receive first and second rotating cams respectively.

26. (Previously Presented) The tube-forming device of claim 25 wherein the first cam opening has a first cam surface engaged by the first rotating cam during a first phase of the tool cycle to move the carrier block in a first direction and wherein the second cam opening has a second cam surface engaged by the second rotating cam during a second phase of the tool cycle to move the carrier block in a second direction.

27. (Original) The tube-forming device of claim 15 further comprising biasing means to bias the carrier block to a neutral position in which the tool is centered with respect to the work piece.

28. (Original) The tube-forming device of claim 27 wherein the biasing means comprises at least one spring that presses against the carrier block.

29. (Previously Presented) The tube-forming device of claim 15 wherein the dual action rotating cam assembly comprises a first rotating cam to drive the tool holder in the first direction during the first phase of the tool cycle to engage the tool with the first side of the work piece and a second rotating cam to drive the tool holder in the second direction during the second phase of the tool cycle to engage the tool with the second side of the work piece.

30. (Original) A method of forming the end of a tubular work piece comprising:

- a) inserting a work piece into a work piece holder such that the work piece inserts over a tool;
- b) rotating a dual action cam assembly to reciprocate the tool during a tool cycle;
- c) wherein during a first phase of the tool cycle, the tool is driven in a first direction by the cam assembly to engage a first side of the tubular work piece; and
- d) wherein during a second phase of the tool cycle, the tool is driven in a second direction by the cam assembly to engage a second side of the tubular work piece.

31. (Original) The method of claim 30 wherein the tool is idle during a third phase of the tool cycle to allow a work piece to be inserted into the work piece holder.

32. (Previously Presented) A tube-forming device comprising:
- a) a work piece holder to receive a tubular work piece;
 - b) a tool insertable into an end of the tubular work piece held by the work piece holder;
 - c) a tool holder to receive the tool and movable in first and second directions; and
 - d) a rotating cam assembly to drive the tool holder in first and second directions during first and second phases of a tool cycle.
33. (Previously Presented) The device of claim 32 wherein the rotating cam assembly comprises first and second rotating cams.
34. (Currently Amended) The device of claim ~~32~~ 33 wherein the first and second rotating cams rotate about the same axis.
35. (Currently Amended) The device of claim ~~32~~ 33 wherein the first and second rotating cams are disposed on a common shaft.
36. (Previously Presented) The device of claim 32 wherein the rotating cam assembly drives the tool holder during a first phase, a second phase, and a third phase of a tool cycle.
37. (Previously Presented) The device of claim 36 wherein the rotating cam assembly is idle during the third phase of the tool cycle.
38. (New) The device of claim 33 wherein the first and second cams are stacked along a common axis of rotation.

39. (New) The device of claim 38 wherein the first cam includes a first lobe that contacts a first surface, and the second cam includes a second lobe that contacts a second surface.

40. (New). The device of claim 32 wherein the rotating cam assembly comprises a rotating cam having first and second lobes that contact first and second surfaces, respectively.